

## **Hamilton Project-Stanford's Woods Institute for the Environment**

New Directions for U.S. Water Policy

20 OCT 2014 (Tim V.'s informal notes)

Not all quotes are verbatim, but I tried to be true to their content and spirit.

**Sheryl Sandberg** Opening remarks. "Knowledge economy based on resource economy - water and energy". Introduced Robin Rubin, one of the founders of The Hamilton Project. Three major papers being released today; links to the papers can be found in the right hand column on this [webpage](#). See also this [column](#) from the N.Y. Times (Eduardo Porter): *The Risks of Cheap Water* [found by Sam Z.]

### **Gov. Brown**

Summarized 10-point CA Water Action Plan including:

"Restored ecosystems capture and store more water" (than damaged habitats)."

"We need to understand the hydrological cycle and align ourselves with it rather than trying to align the hydrological cycle to us." "Vote for Proposition 1". "I haven't done much campaigning for this election, and people are saying they don't know what to expect in a second term, but I'm telling you right now that I'll be focusing on water."

#### I. "SHOPPING FOR WATER..."

**Robert Glennon** (UofA) chief author of the report

Midst of 14 year drought in the Colorado River. Little resiliency around water supply and consumption in all sectors of the economy, e.g., 500,000 acres of fallowed land in CA.

Facebook needs a lot of water to cool plants, fabrication, and a lot of energy. NHL uses a huge amount of water.

What are we going to do?

More dams, more drilling, etc. are typical responses, but not the wisest over the long term. We need a "portfolio approach": conservation efficiency, recycling...

Price signals; Need to break relentless cycle of over-use Five responses:

1. Reform water away from "use it or lose it" disincentive to conservation
2. Market mechanisms to facilitate water trading - banks and exchanges
3. Risk mitigation strategies to enhance system reliability - futures contracts, etc
4. Protect groundwater
5. Continue and expand federal leadership - principally USBR, interstate cooperation, USBR needs to meter water deliveries. Establish pilot projects, e.g. Provide incentives for alfalfa farmers to curtail farming in arid areas in the middle of the summary. A 9% reduction in Ag water consumption would double the available water for residential, commercial, and industrial users. Need a system set up by law (govt.) that facilitates trade). We need sensible rules to protect the economy and the environment. Everyone on the stage agrees we shouldn't harm farming communities. The provision of "no harm to junior water rights" was seen as a major obstacles to more innovative water trading. Alfalfa farming during the summer in AZ and CA uses 4x as much water as the other seasonal cuttings of alfalfa. When those lands are flood irrigated in the summer, a lot of water is lost through evaporation.

Elephant in the room is population growth; we're over 300 million in the US (Gov. Brown mentioned 38 million in CA with a projection for 50 million).

**Panel:**

**Ellen Hanck** (UCD Public Policy Institute)

20 y.o. Water bank in CA allowed you to transfer water w/o risk of losing it.

Mostly farmers are selling the water. Most water that is "wasted" via flood irrigation is already being used by somebody else via recharge, downstream flow.

Think about how market can benefit the environment. A 3rd of the transactions were used for temporary flows to the env. and hopes that some of Prop. 1 can be used to buy permanent water rights for the env. In Australia, \$3.5 B was used to purchase water for the environment and it is working fairly well.

**Thomas Iseman** (DOI-USBR)

System wide conservation effort on the Colorado River involving four cities (inc. Denver) is a model. USBR is using markets to acquire water for instream uses; e.g. On the Klamath River and for tribes. Referenced Water Smart program. Looking forward to empowering local water managers, advancing basin studies and regionalizing water management.

**James Lochhead** (Denver Water)

Failure is not an option, the future of The West is at stake.

Spent \$100 M and saved 100 MAF, but that's not enough.

Institutional and legal barriers, and regulatory framework all support the status quo.

Water rights administration process also preserves the status quo, thereby restricting the ability to be flexible in the marketplace.

We cannot deprive the Ag sector and the environment of the water they need.

Most of the Ag water in the Colorado River basin is used for blue grass, pasture grass, and Alfalfa. We should be promoting densely-populated, vibrant cities and large expanses of productive agriculture.

**William Fillimore**, Paramount Farms

Uncertainty of water markets is preventing them from being fully developed. Any number of entities can "take water from us" (e.g., SWRCB, NMFS, FWS). Disagrees with the recommendation of the report that we need a greater role for govt. We need government out of the way, the "market is stultified by regulation". Where water is expensive (SJV), water is used efficiently and there is no flood irrigation.

**Facilitator (Melissa)** asked about status of measuring in CA. Ellen said refined measuring techniques are here (e.g., satellite measurements in Idaho), and aJames Lochhead said water in Colorado is intensively measured to the point that it preserves the status quo.

David Beckman, Pices Foundation asked whether or not water saved by Ag efficiency would actually be available for other users. The panel referenced the difficulty of answering this simply and clearly.

## II. PATH TO INNOVATION

**Buzz Thompson**, author.

Learn how to get along with less; technology will be increasingly important.

One of the most important areas is "CANDO" technology<sup>1</sup> for water recycling not just for water but for energy; the energy used to recycle water is 4x the energy imbedded in the developed water. [flag for P.K.] Desalination technology could reduce some of the energy costs; but there are also environmental costs of building the infrastructure on the coast. Per comment about water/energy nexus by woman from EPRI, we're moving toward a more distributed system in water use as we are in energy. Traditionally, WWTP were situated at the lowest point in the landscape, wherein it would take a great deal of energy to redistribute recycled water "uphill". We need to have numerous water recycling systems throughout a given watershed.

Four areas considered by the paper

### PRICING

Pricing for water is far less than other comparable resources (e.g., electricity) and this has stifled technical innovation.

We need to price water for what it's actually worth. We don't actually pay for the water itself; we pay for the energy cost of its transport and purification, but nothing for the actual substance.

Australian study: the value of leaving the water in the stream was 3x the value of taking it out of the river for another use. [flag for Valentina and Erin].

### FINANCING

### REGULATIONS

### STATE OFFICE OF WATER INNOVATION

Establish a new State Office

Roger Altman facilitator.

**Michael Markus**, Orange County Water district now producing

72,000 acre-feet/year of recycled water for IDR (indirect potable reuse). He referenced the availability of the \$800 million in earmarked SRF funds @ 1% over 30 years. SB 918 (Pavley) authored a bill requiring a framework for advancing DPR.

Far too many special districts; we need to consolidate water agencies, and even consolidate water AND waste water agencies. Working on "forward osmosis" with a group called Trevi (?). Local water supply reliability.

**Peter Yolles** took advantage of \$6 million in venture capital to advance Water Smart tool to make behavior change in the way consumers think about and use water. He note that there is a Dept. of Energy, but not a Dept. of Water; the water resource is fragmented across several agencies; EPA, USBR, USACE. EPA supporting new (blue?) technologies in key locations (Fresno, Austin). A person from EPRI (Electronic Power Research Institute?) asked a question that I didn't catch because I was trying to figure out the acronym, but its mention created a stir.

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<sup>1</sup> The Stanford Nitrogen Group developed a new wastewater treatment process for the removal and recovery of energy from waste nitrogen (i.e. ammonia). This process improves the efficiency and lowers the cost of nitrogen treatment. The process is termed the Coupled Aerobic-anoxic Nitrous Decomposition Operation (CANDO) and consists of 2 principal steps: biological conversion of ammonia to N2O gas, and combustion of a fuel (i.e. biogas) with N2O to recover energy. It's the first wastewater treatment process to recover energy from nitrogen.

### III. IMPACT OF CLIMATE CHANGE

Facilitated by **Tom Steyer**.

**Wade Crowfoot**, office of the Governor

Lack of Drinking water is one of the most significant impacts of the drought, although impacts to the farm economy are better known. If you drive 3 hours east of here into the Central Valley, you'll find desperate families without drinking water and bathing water; reference also made to communities such as Willits who may run dry. CalFire reported that the King Fire was moving 15 miles/day; the combustability and pace of fire movement is outstripping the conventional models.

**Noah Diffenbaugh**, Stanford Woods

Connection b/w drought and climate change. Big message out of recent IPPC reports is about "risk". Ridiculously resilient ridge (of high pressure). Global warming has caused 3x the risk of drought in CA. Early in the recorded record, temperature and precipitation were decoupled, but global warming has increased the chance 2x that we will have a warm or hot year whenever a drought cycle comes around. High temperatures and drought are now coupled. Proposition 1 is a down payment on the portfolio approach. We're not adapted to the climate we have now; recent large storm events have cost ~\$1 billion each. A "2 degree world" will require a carbon free economy.

**Peter Gleick**, Pacific Institute

As we change the climate, we're going to affect water, the infrastructure, and institutions. Need to focus simultaneously on mitigation and adaptation. Through 2013, the 36 driest months and the 36 hottest months on record. Twenty-two WWTPs in the Bay Area alone that will be adversely affected by a 1 meter rise in sea level.

<http://pacinst.org/publication/the-impacts-of-sea-level-rise-on-the-california-coast/>

Nobody has mentioned the impacts on fisheries which were already imperiled by our water-use practices before the drought even hit. "Peak Water"; we're already taking too much water from the rivers (Colorado, Sacramento) if we care about the other beneficial uses; e.g. fisheries. We can never replace the "snowpack reservoir" in the Sierra Nevada with new storage systems. All the good dam sites have been taken. We need dramatic increases in groundwater storage (and ecosystem restoration too). A "4 degree world" will probably result in a population shift from the Southwest back to the "cooler" climates of the East and upper Midwest.

**Solomon Hsiang**, UCB Goldman school

The economy is comprised of a collection of building blocks (e.g., agriculture, industry, housing) that can be independently affected by drought, and collectively reduce the health and productivity go the economy overall. Uncertainty is increasing in the economy partly because we cannot rely on historic records for forecasts, but rather on computer models. (See "Risky Business" report). In Australia, in a water basin that crossed three states was severely oversubscribed during the long drought, so the government stepped in to manage the river at the watershed scale, and to restore some flows and make sure that each state received an allocation of water.